SEPTEMBER 3, 1984

CHEMICAL & ENGINEERING

NEWS

Chemical educators tackle issues at biennial conference
Page 22

Synthetic Fibers

Apparel imports hold back production growth

A Key Polymers Review Page 11

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CHEMICAL & ENGINEERING NEWS

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SEPTEMBER 3, 1984

News of the Week

■ **More than 11,000 attended the ACS meeting in Philadelphia.** Page 4

■ **Lung disease suffered by cotton workers may be caused by boll endotoxins.** Page 5

■ **New antiulcer drug moves toward regulatory approval.** Page 5

■ **People and places caught by the camera at the ACS meeting.** Page 6

■ **Harvard chemists report the first biomimetic synthesis of prostaglandins.** Page 7

■ **Data on radioactivity released after Three Mile Island accident not complete enough to project health effects.** Page 7

■ **Ray Irani is the new president of Occidental Petroleum.** Page 8

■ **Sinking of French cargo ship carrying uranium hexafluoride highlights dangers of shipping nuclear materials in heavily traveled waters.** Page 8

International Business

Shutdown of petrochemical maker Pétromont's ethylene plant at Varennes clouds Montreal petrochemicals development. **Page 15**

Government

Controversy over acid rain so far has focused on sulfur oxides but their control, even if legislated, may not be adequate if other sources contribute to environmental damage. **Page 18**

Environmental Protection Agency, NSF, and other federal agencies receive supplemental fiscal 1984 appropriations. **Page 20**

Education

Eighth Biennial Conference on Chemical Education finds teachers optimistic that science education reform is under way. **Page 22**

Science

Accidental melting of a diamond surface using a powerful laser beam led to formation of glasslike spherules. **Page 25**

Clues to some steps involved in converting normal genes to cancer-producing oncogenes discovered in U.S., British work. **Page 25**

ACS News

Brian A. Bernstein named treasurer of the American Chemical Society, succeeding Ellington M. Beavers. **Page 26**

Business

U.S. producers of synthetic fibers suffer from import competition, especially from Asia, but quota regulations may slow the decline. **Page 11**

Letters 2
Editor's Page 3

Concentrates
Business 10
Government 17
Science/Technology 21

The Departments
Meetings 28
Newscripts 40

Slumping Synthetic Fibers May Get Help from Import Limits

To go into effect in October, regulations would reduce imports of apparel, which are hurting U.S. production of polyester, nylon, acrylic fibers

Bruce F. Greek, C&EN Houston

Following a strong recovery, the synthetic fibers industry is not having a good year. Production of both polyester and acrylic fibers is forecast to decline in 1984. The major reason for this slump: increasing imports of products of these fibers, mainly in the form of apparel. Nylon fiber production will be up slightly, primarily because carpet is its major market and because imports of carpet that compete with U.S.-produced nylon carpet are small.

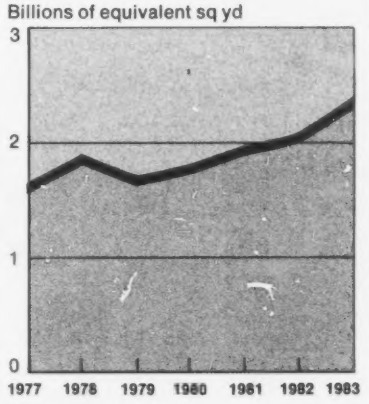
Some help is in sight, however. On Oct. 31, regulations are scheduled to go into effect that would limit imports of apparel to the U.S. These regulations, originally slated to take effect this week but delayed by Treasury Secretary Donald T. Regan late last month, are designed to reduce partly the fast rise in shipments of apparel to the U.S. Imported apparel has been cutting into sales of U.S.-produced apparel.

What the regulations say, in effect, is that countries whose apparel import quotas are filled no longer can ship finished or partially finished apparel to other countries whose quotas are not filled and where the apparel is finished and shipped into the U.S. under the unfilled quotas.

Key Polymers

The new regulations likely won't be of much help to the synthetic fibers industry this year. And they probably will not reverse the rise in imports of apparel containing man-made fibers; they will merely slow their rate of growth, according to industry sources. Ways will be found to change quotas or to evade any kind of limits, especially under the pressure of the strong U.S. dollar.

Imports of man-made fiber apparel continue to rise



Source: Textile Organon

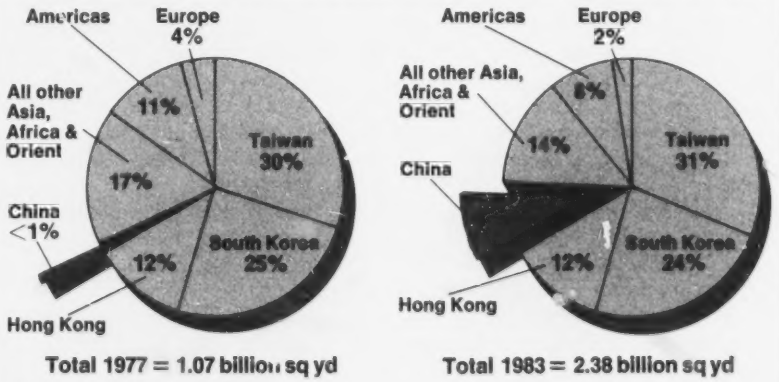
The quantity of apparel imports in 1984 also is difficult to forecast. The gain, if the regulations are in effect for more than a quarter of the year, could be below the 13.4% increase of 1983 over 1982.

So far in 1984, imports of certain apparel items are up so much that, even with the new regulations, the total very likely will rise more than 10% again, possibly close to 15%, for the year. Even with stronger limitations on imports in future years, forecasts indicate that imports of apparel will continue to rise.

At the same time, declines in exports of U.S.-produced fibers, especially polyester, could continue. The net effect of lower fiber exports and higher apparel imports on U.S. synthetic fiber output could be the one predicted by many in the industry—that of a continuing decline.

For details of the current year's outlook for the three major synthetic fibers, please see the following pages.

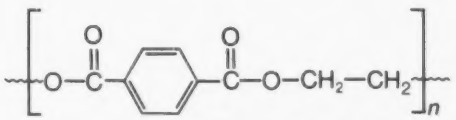
China gains in share of man-made fiber apparel imports, other Far Eastern countries hold share as total volume rises



Source: Textile Organon

Key Polymers

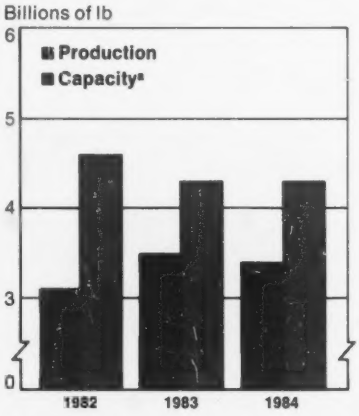
Polyester



Poly(ethylene terephthalate)

- ***Output down slightly***
- ***Capacity fall halted***
- ***Prices weaker***

PRODUCTION/CAPACITY



[a] First quarter.

HOW MADE

Reaction of dimethyl terephthalate or terephthalic acid with ethylene glycol to make bis(2-hydroxyethyl)-terephthalate, which is polymerized catalytically to poly(ethylene terephthalate)

MAJOR END USES (U.S.)

Apparel 50%, home furnishings 20%, industrial 30%

FOREIGN TRADE

Exports—declining to 250 million to 300 million lb in 1984, imports—rising to more than 50 million lb

PRICES

150-denier textured filament 85 to 90 cents per lb; staple, 80 to 85 cents per lb; discounts vary

COMMERCIAL VALUE

$3 billion for production, 1984

Polyester fibers are facing the same major problem that other fibers are facing—the onslaught of imported apparel. The rise in imports of apparel containing polyester fibers and changes in fashion favoring other fibers, especially cotton, will combine to lower production of polyester fibers this year.

In 1984, production of polyester fibers will amount to about 3.4 billion lb, down about 100 million lb from 1983. This will be well below the record production in 1979 of 4.18 billion lb, which may not be matched for some years.

Capacity to make polyester fibers has been higher in the past. For the beginning of 1984, capacity totaled nearly 4.3 billion lb, off from the record by several hundred million pounds. Some increases in capacity are slated for 1984, but they will add less than 100 million lb to the total. Possible shutdowns could offset these gains.

Excluding the added capacity from any partial-year production, the operating rate for 1984 for polyester fibers plants will average nearly 80%. This will be off just slightly from the 1983 operating rate. But it may portend a slow decline in rates until some capacity is scrapped as obsolescent in the face of rising apparel imports.

Apparel and home furnishings account for nearly 75% of polyester consumption in the U.S. These diverse uses are those being hit by imported products and by fashion changes.

Some analysts estimate that this year imports of apparel containing polyester fibers will be up at least a third over those in 1983. Such a gain, and it could be higher according to other views, lies behind the difficult times being experienced in the textile industry. Demand growth for all kinds of apparel now averages 1 to 3% a year, meaning that imported finished apparel heavily cuts into demand for domestically produced apparel.

Fashion changes also are having a big impact on polyester demand. Consumption of materials with higher cotton contents in blends with polyester or all-cotton fabrics is rising.

All-cotton garments also are reported by some analysts as beginning to cut into demand for polyester fibers. Both domestic and foreign apparel made of cotton seem to be selling well now. Apparently imported all-cotton apparel is selling competitively, partly because China has had two years of above average cotton crops and other, smaller cotton producers in the world also have had good crops.

In the past, imported apparel made in part or entirely of polyester fibers has had lesser effect on U.S. fiber production. This was because fiber was exported to be returned as finished apparel. Now several other countries have polyester fiber operations that are competing with U.S. fiber exports. The net result of lower exports is an additional, although lower, pressure on U.S. polyester fiber production. As a result of this competition, U.S. exports of polyester fibers in 1984 are estimated at no more than 300 million lb, and probably will be below this level.

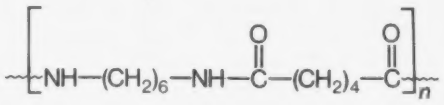
Home furnishings markets for polyester fibers are not yet strongly affected by imports. Imports of sheets, tickings, and other bedding components are rising fast, but from a small base. Polyester meets strong performance competition from nylon in carpet uses and goes mainly into lower-cost carpet.

Industrial uses of polyester fibers are rising with the economic recovery, especially in such areas as tire cord, plastic- and rubber-coated fabrics, and hose. Tire cord is recovering on a volume basis, but is not back to historical levels when few radial tires were used and all new cars had a conventional-size spare tire.

Polyester, as the largest volume synthetic fiber, could be the indicator for the future. Its future growth will slow or possibly decline, owing to foreign competition in finished apparel. If output is to turn up again, costs all along the line will have to be reduced.

Key Polymers

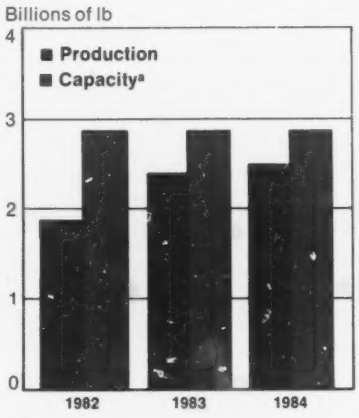
Nylon



Nylon 66

- ***Production to rise***
- ***Capacity holding***
- ***Prices improved***

PRODUCTION/CAPACITY



a First quarter.

HOW MADE

Nylon 66—adipic acid and hexamethylenediamine reacted to form hexamethylene diammonium adipate, which is polymerized by removal of water; nylon 6—caprolactam polymerized by addition and subsequent removal of water

MAJOR END USES (U.S.)

Home furnishings 60%; apparel 20%

FOREIGN TRADE

Exports—to rise to about 125 million lb this year, imports—to increase to about 50 million lb

PRICES

Carpet staple $1.10 to $1.25 per lb; apparel grades $1.50 to $3.00; discounting continuing

COMMERCIAL VALUE

$3 billion for production, 1984

Nylon's success in 1984 will depend on the construction business—more specifically, on carpet use. There is probably enough nylon fiber produced, either ready to go into carpet or in manufactured carpet, to meet demand for the rest of the year. A surge in carpet demand during the last quarter probably would not help nylon fiber production this year, but it could set the stage for a fast start in 1985.

Since housing starts have been relatively strong, but so far not at record-breaking levels for much of 1984, nylon fiber demand has risen. This probably will result in an increase in nylon fiber production of 5% or a bit less for all of 1984 to about 2.5 billion lb. The gain this year will be in the 100 million lb range, a shadow of the gain in 1983 when production rose almost 500 million lb during the economic recovery. Production in 1982 of 1.93 billion lb was the lowest since 1971.

Nylon fiber production capacity is holding at about 2.9 billion lb a year. A small portion of this capacity apparently can be used to make other fibers. Neglecting the very small swing capacity and taking 1984 production at 2.5 billion lb, the operating rate for this year once again will run above 85%, a level reached in the late 1970s.

No new capacity is expected to be built anytime soon. Now that the economic recovery is well under way, gains in production are expected to be small. Additional capacity will be obtained from the usual debottlenecking methods and through replacement of lines of old machinery. The amount of additional capacity to be added is forecast to be small for the next few years. This situation will prevail until capacity is pushed very hard.

Prospects now are for continued small gains in production next year unless a major downturn in the economy occurs during the second half. Housing use of nylon carpet may not gain much next year, but prospects are good for the commercial or contract carpet business to follow its usual lagging cycle of feeling the effects of a recession last and recovering last.

With home furnishings taking more than 60% of nylon fiber production, this use gets most of the attention by forecasters. Home furnishings should really be termed carpet because all other uses of nylon fibers in home furnishings total 5% or less. Hence, with more than half of nylon fiber use going to carpets, and a major share of this in home carpets, analysts are watching closely all the factors that influence housing construction and sales.

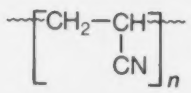
Of the noncarpet uses of nylon fibers, about half is apparel and half industrial uses. Each of these categories further breaks down into many small markets. None of these are changing enough to have significant impact on total nylon demand this year, but some are improving as a result of fashion changes and the recovery.

Most of the apparel items proffer steady demand for nylon fibers, even during recession times. No new developments have occurred to change demand in such items as underwear, nightwear, robes, socks, or sweaters. Hosiery has received a slight boost from fashion as a result of a shift toward more patterns and colors.

Industrial uses of nylon fibers are being boosted as expected by the recovery. Tire demand, especially for truck and off-the-road tires, has been strong and is expected to remain so because of the expanded road building programs. This will continue even with a slowdown in the economy. Tire cord accounts for roughly 50% of the industrial demand for nylon fibers and probably will change little over the next few years.

On balance, nylon, in its main use as carpet, accounts for most of the market, so the fiber's capture potential is small. Therefore, the outlook for nylon will be that of slow, steady growth when averaged over good and bad economic times.

Key Polymers

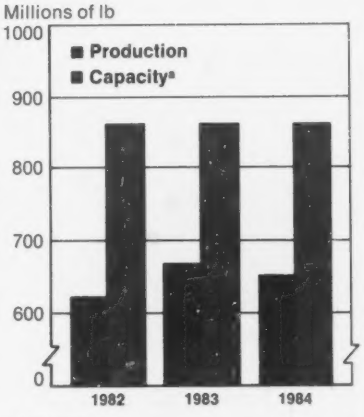


Polyacrylonitrile

Acrylic

- ***Production off a bit***
- ***Capacity on hold***
- ***Prices steady***

PRODUCTION/CAPACITY



[a] First quarter.

HOW MADE

Polymerization of acrylonitrile, a product of the reaction of ammonia and propylene

MAJOR END USES (U.S.)

Apparel 65%, home furnishings 30%, industrial 5%

FOREIGN TRADE

Exports—to decline to under 150 million lb in 1984, imports—to rise to about 20 million lb

PRICES

3-denier staple for apparel 90 cents to $1.10 per lb; discounting significant

COMMERCIAL VALUE

$600 million for production, 1984

After a good recovery in 1983, acrylic fiber production will decline slightly in 1984. The major cause of this year's slump in production is the same as that for all of the synthetic fibers' production growth problems—imports of products of these fibers, mainly in the form of apparel. For acrylic fibers, rising imports of apparel and a decline in exports of the fiber itself combine to have a greater effect than for the other important synthetic fibers.

In 1984, production of acrylic fibers probably will be down 3% from its 1983 level to about 650 million lb. Most industry analysts expect this to be the top end of what will be produced this year. However, their forecasts of production range from 630 million to 670 million lb.

Capacity to make acrylic fibers generally is holding level. Minor debottlenecking is taking place but won't add significantly to capacity. Estimates of capacity range from 810 million to 870 million lb a year, depending on the fiber denier.

If capacity is about 860 million lb and if production reaches 650 million lb, then the average plant operating rate in 1984 will be more than 75%. This operating rate will be slightly below the average for the chemical industry this year. In addition, it will be well below the recent historical high for acrylic fibers of 91% in 1980 when production was more than 780 million lb from about the same capacity.

The operating rate in 1983 was a couple of percentage points higher at nearly 78%. This could be the best operating rate of the next few years, unless some major technical development or fashion change aids acrylic fibers, according to some industry observers. This low operating rate and the prospect of slowing demand could continue to put pressure on acrylic fiber prices.

Imports of apparel made of acrylic fibers are reducing domestic use and production of this fiber. Imported women's sweaters this year could account for half of U.S. sales, possibly as much as two thirds. Imported men's sweaters lag women's in their share of sales, making up one third to one half of the total U.S. market. Thus, imports may account for half of U.S. retail sweater sales in 1984. Sweaters currently account for about 15% of acrylic fiber use.

Fashion, too, is influencing demand for acrylic fibers in sweaters. Cotton is staging a comeback in sweaters as well as in many other apparel items, many of which don't contain acrylic fibers.

Gains in use of acrylic fibers in several areas of active or sportswear offset some of the losses in demand in sweaters caused by imports. Socks, long an important use of acrylic fibers, continue to be strong this year with good gains except for the lowest priced, so-called "tube" socks, which increasingly are being made of cotton. Demand for active wear is in even better shape because of the growing interest in sports and physical fitness.

Some of acrylic fibers' old standbys, however, aren't doing so well and may decline fairly rapidly in their share of the fiber use. Craft yarns, for example, are weak now for reasons that are unclear except for an assumption that today fewer people knit at home. Acrylic fiber blankets, long considered aesthetically pleasing substitutes for more expensive wool blankets, are in a slump, partly because of market capture by lower-cost polyester fiber blankets. Carpet use continues to decline because of competition from polyester and nylon fibers.

Clearly, what acrylic fibers need is some fashion or technical development to make them the preferred fiber, regardless of cost, in present or new uses. These fibers also need some relief from imports of apparel. As a result, the small decline in production in 1984 could be repeated next year and each year thereafter for some time unless acrylic fibers get a new market to spur their use.